USER'S MANUAL

1006 / 1020 / 1160 / 1260

General Safety Notice

1. Safety Terms and Symbols

Terms in this manual:
These terms may appear in this manual:

WARNING: Warning statements identify conditions or practices that could result in injury or loss of life.

CAUTION: Caution statements identify conditions or practices that could result in damage to this product or other property.

Terms on the Product:
These terms may appear on the product:

DANGER: indicates an injury hazard may be immediately accessible.

WARNING: indicates an injury hazard may be not immediately accessible.

CAUTION: indicates that a potential damage to the instrument or other property might occur.

Symbols on the Product:
These symbols may appear on the product:

2. General Safety Information
Carefully read the following safety information in order to avoid any personal injury or damage on this product or any products connected with it. Review the following safety precautions carefully before operate the device to avoid any personal injuries or damages to the device and any products connected to it. To avoid potential hazards use the device as specified by this user's manual only.

- **To Avoid Fire or Personal Injury.**
- **Use Proper Power Cord**. Use only the power cord specified for this product and certified for the country of use.
- **Connect and Disconnect Properly**. Do not connect or disconnect probes or test leads while they are connected to a voltage source.

- **Connect and Disconnect Properly**. Connect the probe output to the measurement device before connecting the probe to the circuit under test. Disconnect the probe input and the probe reference lead from the circuit under test before disconnecting the probe from the measurement device.

- **Observe All Terminal Ratings**. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

- **Use Proper Probe**. To avoid shock hazard, use a properly rated probe for your measurement.

- **Avoid Circuit or Wire Exposure**. Do not touch exposed connections and components when power is on.

- **Do Not Operate With Suspected Failures**. If suspected damage occurs with the device, have it inspected by qualified service personnel before further operations.

- **Provide Proper Ventilation**. Refer to the installation instructions for proper ventilation of the device.

- **Do not operate in Wet/Damp Conditions**.

- **Do not operate in an Explosive Atmosphere**.

- **Keep Product Surfaces Clean and Dry**.

Digital Scope Meters

Protek1000 Series digital scope meters offer exceptional waveform viewing and measurements in a compact, lightweight package. Protek1000 series is ideal for production test, field service, research, design, education and training involving applications of analog circuit tests and troubleshooting.

Product features:

- **Dual Channel, Bandwidth:**
  60MHz (Protek1006)
  200MHz Protek1020)
  600MHz (Protek1160)
  600MHz (Protek1260)
- **Maximum real-time sampling rate:**
  150MSa/s (Protek1006)
  500MSa/s (Protek1020)
  1GSa/s (Protek1160)
  2GSa/s (Protek1260)

- **Memory depth:**

  32K points (Single Channel), 16K points (Dual Channels)
- Color TFT LCD, 320×240 pixels resolution.
- USB storage and printing supports, firmware upgrade via USB interface.
- Adjustable waveform intensity, more effective waveform viewing.
- One-touch automatic setup, ease of use (AUTOSET).
- 15 Waveforms, 15 setups, supports CSV and bitmap format.
- 20 Automatic measurements.
- Automatic cursor tracking measurements.
- Waveform recorder, record and replay dynamic waveforms.
- User selectable fast offset calibration.
- Built-in FFT function, Frequency Counter.
- Pass/Fail Function.
- Add, Subtract, Multiply and Division Mathematic Functions.
- Advanced trigger types include: Edge, Pulse width.
- Multiple Language User Interface.
- Pop-up menu makes it easy to read and easy to use.
- Built-in Chinese and English help system.
- Easy-to-use file system supports Chinese & English characters file name input.
- Selectable 20 MHz bandwidth limit;
- External trigger;

User’s Interface

The first thing to do with a new scope meter is to know its front panel. This chapter helps to be familiar with the layout of the keys and how to use them. Read this chapter carefully before further operations.

Front Panel (Figure 1-1):
The buttons allow you to use some of the functions directly but also bring up the manual keys on the screen, which enable the access to many measurement features associated with advanced functions, mathematics, and reference or to run control features.

Figure 1-1
Protek1000 Series H/H Scope Meter Front Panel

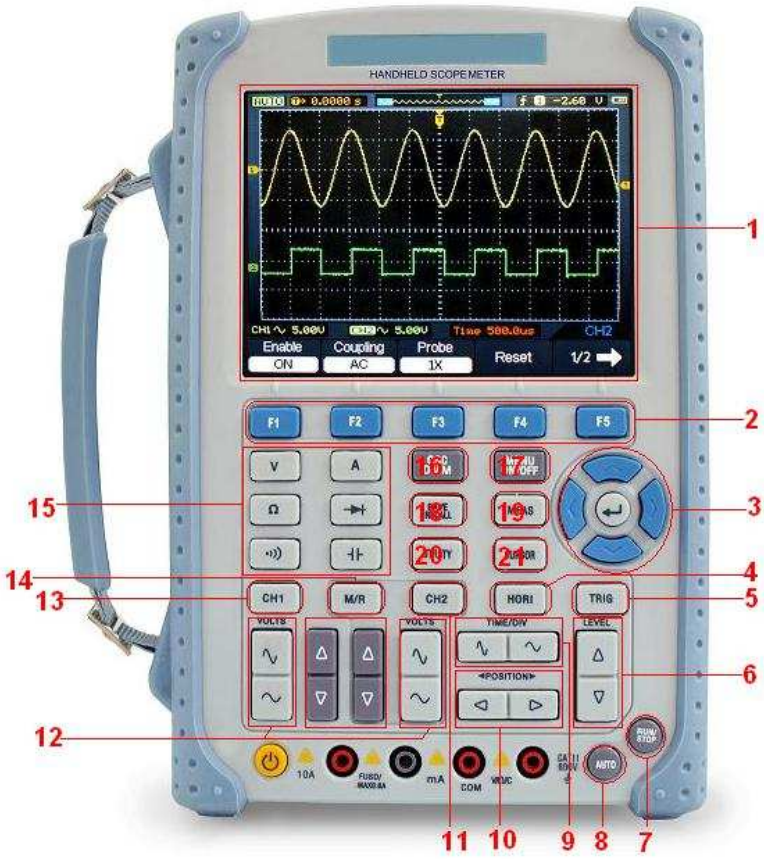


Figure 1-2
Front Panel Description

Description

1. LCD Display.
2. **F1**～**F5**: Sets or switch options for the menu.
3. Arrow Keys
4. **Hori**: Shows **Hori** menu
5. **TRIG**: Shows **TRIG** menu
6. **Level**: Adjust the trigger level.
7. **RUN/STOP**: key for running or stopping the operation.
8. **AUTO**: Be used for auto setting under the oscilloscope operation mode
9. **TIME/DIV**: Decrease or Increase the time base.
10. **POSITION**: Adjust the horizontal trigger position.
11. **CH2**: Shows the **CH2** menu.
12. **VOLTS**: Decrease or Increase the voltage/div.
13. **CH1**: Shows the **CH1** menu.
14. **M/R**: Shows the **Math** or **REF** menu.
15. **DMM Buttons**: The **DMM** control buttons.
16. **DMM/SCOPE**: Switch **DMM** or **Scope** function.
17. **MENU ON/OFF**: Turn on/off the menu
18. **SAVE RECALL**: Shows **SAVE** or **RECALL** menu
19. **MEAS**: Shows Measurement menu
20. **UTILITY**: Shows **UTILITY** menu
21. **CURSOR**: Shows **CURSOR** menu

Display screen

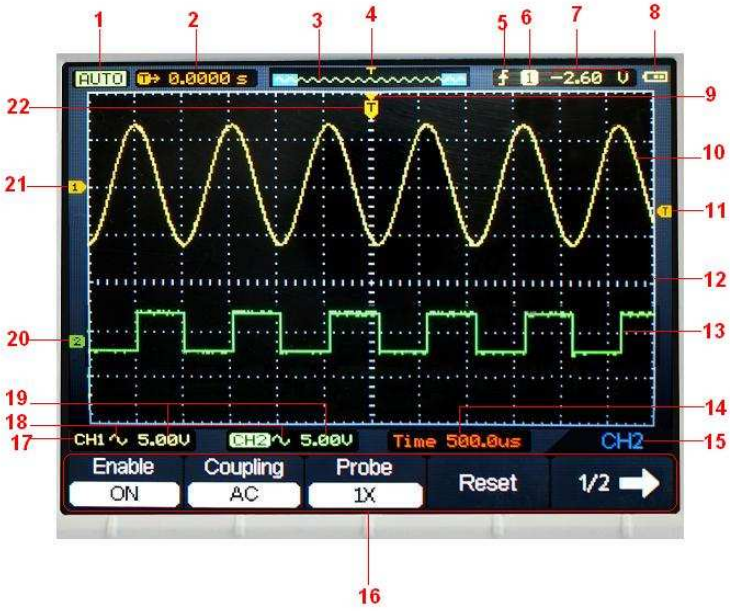


Figure 1-3
LCD Display screen

Description

1. Shows running status.
2. Shows delay time
3. Shows location of the current waveform in the memory.
4. Shows the trigger position in the memory.
5. Shows the trigger mode.
6. Shows the trigger source.
7. Shows the trigger level.
8. Shows the power.
9. The center of current waveform window.
10. CH1 waveform.
11. The trigger level symbol.
12. The grid
13. CH2 waveform.
14. Shows the time base.
15. Shows the menu title.
16. The menu
17. CH1/CH2
18. Shows the coupling.
19. Shows the voltage/div.
20. CH2 mark.
21. CH1 mark.
22. Shows the trigger position in current waveform window.

Function Check

Perform this quick functional check to verify that your scope meter is operating correctly.

1. Turn on the instrument.
Use the power cords designed for your scope meter only. Use a power source that delivers 100 to 240 VACRMS, 50Hz. Turn on the scope meter.

WARNNING: To avoid electric shock, be sure the scope meter is properly grounded.

2. Input a signal to a channel
Set the attenuation switch on the probe to 10X and connect the probe to Channel 1 on the scope meter.
To do this:

- Align the slot in the probe connector with the key on the CH 1 BNC connector.
- Push to connect, and twist to the right to lock the probe in place.
- Attach the probe tip and ground lead to the PROBE COMP connector.

Set the probe attenuation of the scope meter to 10X.To do this, push CH1→Probe→10X.

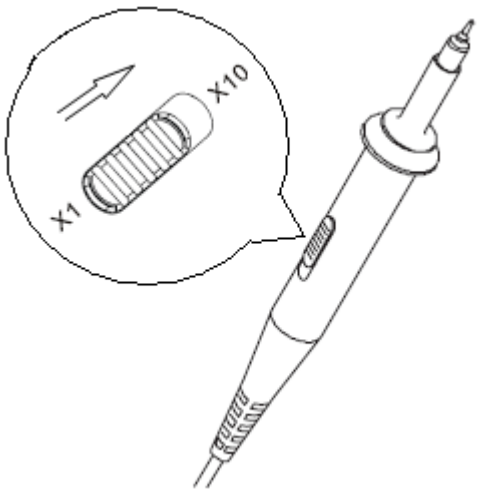


Figure 1-5
Set the probe

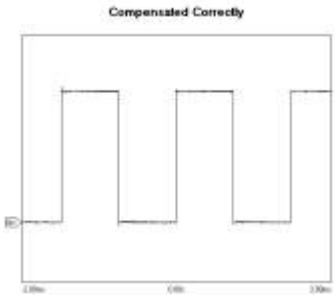
Push the **AUTO** button. Within a few seconds, a square wave will display (approximately 1 kHz 2 V peak- to- peak).

Turn off Channel 1 and turn on Channel 2, repeat steps 2 and 3.

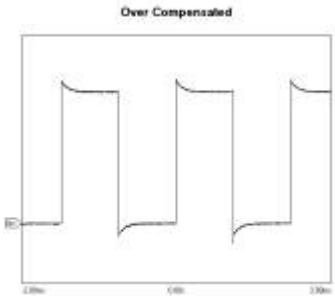
To compensate probes

Perform this adjustment to match the characteristics of the probe and the channel input. This should be performed whenever attaching a probe to any input channel the first time.

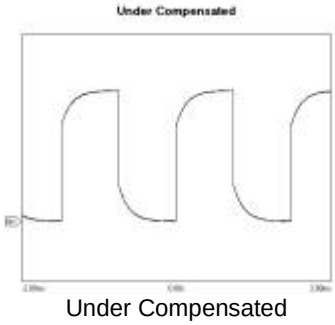
1. From CH1 menu, set the Probe attenuation to 10X (press CH1→Probe→10X).
   Set the switch to 10X on the probe and connect it to CH1 of the scope meter.
   When using the probe hook-tip, inserting the tip onto the probe firmly to ensure a proper connection.
   Attach the probe tip to the Probe compensator connector and the reference lead to the ground pin, Select CH1, and then press AUTO.
2. Check the shape of the displayed waveform.



Correctly Compensated



Over compensated



Under Compensated

3. If necessary, use a non-metallic tool to adjust the trimmer capacitor of the probe for the flattest square wave being displayed on the oscilloscope.

4. Repeat if necessary.

WARNNING: To avoid electric shock while using the probe, be sure the perfection of the insulated cable, and do not touch the metallic portions of the probe head while it is connected with a voltage source.

To display a signal automatically

Protek1000 Series has an Auto feature that automatically sets up the scope meter to best display the input signal. Using Auto requires signals with a frequency greater than or equal to 50 Hz and a duty cycle greater than 1%.

Press the AUTO button, the scope meter turns on and scales all channels that have signals applied, and it selects a time base range based on the trigger source. The trigger source selected is the lowest numbered input that has a signal applied.

Protek1000 Series scope meters have two-channels input and an external trigger input. Connect a signal to the channel 1 input.

1. Connect a signal to the scope meter.
2. Press AUTO.

The scope meter may change the current setting to display the signal. It will automatically adjust the vertical and horizontal scaling, the trigger coupling, type, position, slope, level, and mode settings.

Using the Scope Meter

This part provides a step-by-step introduction to the scope meter functions. The introduction does not cover all of the capabilities of the scope meter functions but gives basic examples to show how to use the menus and perform basic operations.

Turn on the scope meter

Connect scope meter to AC power via a power adapter. (The scope meter can still work with built-in Li-ion battery even without AC power supply.)
Turn the scope meter on by pressing down the power on/off key.
The instrument then performs Self-checking after power on. The welcome picture will display on the screen when the system finishes Self-checking.
The scope meter is powered up in its last setup configuration.

Figure 1-6

Menu Operation

The following example shows how to use the tool's menus to select a function, as shown in the following figure.

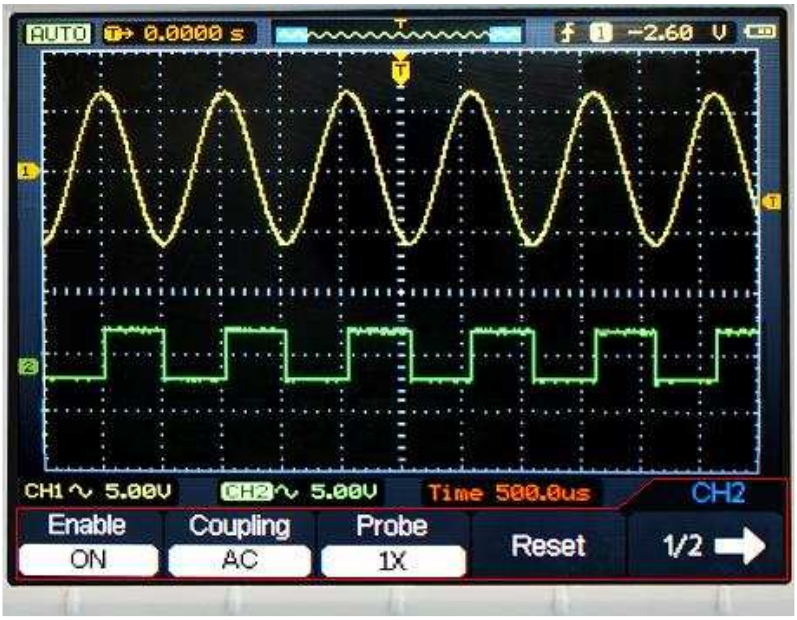


Figure 1-7
The Menu

1. Press the MENU ON/OFF key to display the Function Menu on the bottom of the screen and the corresponding optional settings on the bottom. Press MENU ON/OFF again will hide the Function Menu.
2. Choose one key from F1 to F5 and press it to change function setting.

To set up the vertical system

1. **Change the vertical setup and notice that each change affects the status bar differently.**
   - Change the vertical sensitivity with or button and notice the change in the status bar.
2. **Move the signal vertically.**

- The △/ ▽ button moves the signal vertically. Also notice that the channel symbol on the left side of the display moves in conjunction with the button.

To set up the horizontal system

1. **Change the time base.**
   - The ◠◡ or ◡◠ button changes the time base in a 1-2-5 step sequence, and displays the value in the status bar.
2. **Move signal horizontally.**
   - The ◁ or ▷ button moves displayed signal horizontally on waveform window. It set the trigger point position.

To set up the trigger system

1. **Change the trigger Level**
   - The △ or ▽ button change the trigger level. The trigger level value is displayed at the top-right of the screen and a line is displayed showing the location of the trigger level.
2. **Change the trigger setup and notice these changes in the status bar.**
   - Press TRIG button in the key panel.
     Choose one key from F1 to F5 and press it to change function setting.
3. **Press 50%**

The **50%** button sets the trigger level to the center of the signal.

Specifications

Vertical

Channels	2
Bandwidth	Protek1006: 60MHz Protek1020: 200MHz Protek1160: 600MHz Protek1260: 600MHz
Rise Time	Protek1006: 5.8ns Protek1020: 1.7ns Protek1160: 0.58ns Protek1260: 0.58ns
Input Impedance	Resistance: 1M;Capacitance: 15pF
Input Sensitivity	Protek1006: 10mV/div to 5V/div Protek1020: 2mv/div to 10v/div Protek1160: 2mv/div to 10v/div Protek1260: 2mv/div to 10v/div
Input Coupling	AC, DC with Ground Level Indicator
Vertical Resolution	8bits
Memory Depth	32k at single channel; 16k at dual channel
Maximum Input	300V(DC+AC Peak)

Horizontal

Sampling	Protek1006: 150MSa/s Protek1020: 250MSa/s Protek1160: 1GSa/s Protek1260: 2GSa/s
Equivalent Sampling	50GSa/s
Time Base Range	Protek1006: 5ns/div ~ 1000s/div Protek1020: 2ns/div ~ 1000s/div Protek1160: 1ns/div ~ 1000s/div Protek1260: 1ns/div ~ 1000s/div
Time Base Precision	±50ppm

Trigger

Source	CH1, CH2
Mode	Protek1006: Edge, Pulse Width, Alternative Protek1020, 1160, 1260: Edge, Pulse Width, Alternative, Video.

X-Y Mode

X-Axis Input	Channel 1
Y-Axis Input	Channel 2
Phrase Shift	Max.3 degree

Cursors and Measurement

Voltage	Vpp,Vamp,Vmax,Vmin,Vtop,Vmid,Vbase,Vavg Vrms,Vcrms,Preshoot,Overshoot
Time	Frequency,Rise time,Fall Time,Postive Width,Negative Width,Duty Cycle,
Delay	Delay 1->2↑, Delay 1-2↓
Cursors	Manual,Track,Auto Measure Modes
Math	Addition, Subtraction, Multiplication, Division, FFT
Storage	15 Waveforms and setups

Meter Mode

Maximum Resolution	6000 Counts
DMM Testing Modes	Voltage,Current,Resistance,Capacitance, Diode & Countinuity
Maximum Input Voltage	AC: 600V DC: 600V

Maximum Input Current	AC: 10A DC: 10A
Input Impedance	10M

DISPLAY

TFT LCD Type	5.7 Inch width LED Backlight Display
Display Resolution	240 (Vertical) X 320 (Horizontal) Dots

INTERFACE

USB	USB host/Device 2.0 Full Speed Supported
Optional	RS232, LAN

POWER SOURCE

Line Voltage Range	AC 100V ~ 240V, 50Hz ~ 60Hz; DC Input: 8.5 VDC, 1500mA
Battery Power (Installed)	6 hours (Li-ion Battery)

MECHANICS

Dimension	245 x 163 x 52 (mm)
Weight	1.2Kgs

Other

GND Reference scope meter and multimeter Independence